

1    I CLAIM:

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3            1.    An LED array assembly, comprising in  
4 combination:

5            a)    a grid of electrical conductors,

6            b)    light emitting diodes in association  
7 with the grid and in electrical communication with the  
8 conductors that provide power for LED operation,

9            c)    the grid operable to receive heat from  
10 the diodes during diode operation, and the grid  
11 configured for passing coolant fluid for transfer of  
12 heat to the fluid.

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15            2.    The combination of claim 1 wherein the  
16 electrical conductors comprise insulated metal wires  
17 that act as electrical and thermal conductors and that  
18 also serve as structural load conductors, for arrays of  
19 such diodes.

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22            3.    The combination of claim 1 wherein the  
23 wires are dielectrically coated.

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1           4.     The combination of claim 1 wherein the  
2 conductors comprise woven wires.

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5           5.     The combination of claim 1 wherein the  
6 array has at least one of the following:

- 7                   i)     curvature  
8                   ii)    complex shape  
9                   iii)   compliant configuration  
10                  iv)   flexibility.

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13           6.     The combination of claim 1 including  
14 means to effect and/or guide flow of coolant fluid  
15 through or along the array.

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18           7.     The combination of claim 1 wherein the  
19 grid is dark to increase viewing contrast with LEDs  
20 during their operation.

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1           8.    The combination of claim 1 including one  
2 of the following:

- 3                   i)   a substrate above which LEDs are  
4                        placed  
5                   ii) a superstrate associated with the  
6                        array and LEDs to provide  
7                        structural strength to the  
8                        assembly.

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11           9.    The combination of claim 1 including a  
12 first sheet facing the diodes, to pass light emitted by  
13 the diodes.

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16           10.   The combination of claim 9 including a  
17 second sheet at the opposite side of the screen and  
18 diodes, the first and second sheets forming an  
19 enclosure within which coolant fluid is flowable.

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22           11.   The combination of claim 1 wherein the  
23 electrical combination includes primary conductors  
24 extending generally in one direction, and secondary  
25 conductors extending generally in another direction,

1 the LEDs mounted on the primary conductors, and having  
2 terminals extending to the secondary conductors for  
3 electrical association thereto.

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6 12. The combination of claim 11 wherein the  
7 secondary conductors are configured to extend above  
8 and/or below the primary conductors.

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11 13. The combination of claim 12 wherein the  
12 secondary conductors are characterized by one of the  
13 following:

14 i) substantial spacing therebetween to  
15 pass coolant fluid through the  
16 grid,

17 ii) lack of substantial spacing  
18 therebetween, to pass coolant fluid  
19 parallel to the grid,

20 iii) cross sections which are  
21 substantially less than the cross  
22 sections of primary conductors  
23 which support diodes,

24 iv) junctions with diode wires.

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1                   14. The combination of claim 1 wherein  
2 certain of the conductors include multiple wire  
3 strands.

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6                   15. The combination of claim 1 including  
7 balls or beads seated on the conductors to act as  
8 spacers.

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11                   16. The combination of claim 1 including  
12 means for displacing and conducting coolant to one side  
13 of the screen, to flow through or adjacent to the  
14 screen.

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17                   17. The combination of claim 1 including a  
18 transparent panel extending in the path of light from  
19 the LEDs.

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22                   18. The combination of claim 1 wherein each  
23 diode includes a light emitter or emitters, a  
24 transparent container having a window area, the emitter  
25 supported within the container, and a reflector within

1 the container to reflect emitted light toward said  
2 window.

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5 19. The combination of claim 18 including an  
6 electrical lead or leads extending with helical  
7 configuration within the container to said emitter or  
8 emitters.

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11 20. The combination of claim 19 wherein the  
12 lead or leads has or have a generally rectangular cross  
13 section, and support the emitter or emitters.

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16 21. The combination of claim 18 including a  
17 metallic base carrying the container, and through which  
18 said lead or leads extend.

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21 22. The combination of claim 20 wherein said  
22 lead or leads include wires associated with a red  
23 and/or green and/or blue emitter.

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1                   23. The combination of claim 18 wherein  
2 multiple of said diodes have their container windows  
3 facing in the same or selected directions.

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6                   24. The combination of claim 23 wherein the  
7 diodes and screen define a display.

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10                  25. The combination of claim 21 wherein said  
11 base has an edge portion defining a recess for  
12 reception of a support for the diode, allowing diode  
13 rotation about the support.

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16                  26. The combination of claim 25 including  
17 electrical conductors defining a mesh, and multiple of  
18 said LED devices carried by the mesh, with said  
19 recesses receiving portions of said conductors allowing  
20 rotation of the devices relative to the mesh.

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23                  27. A light emitting diode device,  
24 comprising, in combination

25                    i) an electrically energizable light  
26                    emitter, or emitters;

1                   ii) a transparent container having a  
2                   window;  
3                   iii) the emitter or emitters supported  
4                   within the container;  
5                   iv) and a reflector structure within  
6                   the container to reflect emitted  
7                   light toward said window.

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10               28. The combination of claim 26 including an  
11 electrical lead or leads extending with helical  
12 configuration within the container to said emitter or  
13 emitters.

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16               29. The combination of claim 27 wherein the  
17 lead or leads has or have a generally rectangular cross  
18 section, and support the emitter or emitters.

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21               30. The combination of claim 26 including a  
22 metallic base carrying the container, and through which  
23 said lead or leads extend.

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1           31. The combination of claim 26 wherein said  
2 reflector structure includes spaced reflecting walls,  
3 and a curved reflector supported between said walls.

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6           32. The combination of claim 28 wherein said  
7 lead or leads include wires associated with a red  
8 and/or green and/or blue emitter.

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11           33. The combination of claim 26 wherein  
12 there are multiple of said devices having thin windows  
13 facing in a display direction or directions.

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16           34. The combination of claim 33 including  
17 display structure supporting said diode in a multiple  
18 diode display configuration.

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21           35. The combination of claim 30 wherein said  
22 base has an edge portion defining a recess for  
23 reception of a support for the diode, allowing diode  
24 rotation about the support.

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1                   36. The combination of claim 1 wherein  
2 certain of said conductors that provide power for diode  
3 operation comprise first, second and third pairs of  
4 wires to transmit electrical energization to red, green  
5 and blue LED pixels, respectively.

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8                   37. The combination of claim 36 wherein each  
9 LED has primary, secondary and tertiary wires  
10 electrically connected to the red, green and blue  
11 pixels, respectively, said primary wire clamp connected  
12 to said first pair of wires, said secondary wire clamp  
13 connected to said second pair of wires, and said  
14 tertiary wire clamp connected to said third pair of  
15 wires.

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18                   38. The combination of claim 37 wherein said  
19 three pairs of wires are disposed about a central  
20 region, and said primary, secondary and tertiary wires  
21 are respectively nested between said three pairs of  
22 wires, there being a retainer acting to clamp said  
23 primary, secondary and tertiary wires in nested  
24 position.

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1           39. The combination of claim 38 wherein said  
2 certain conductors extend at an acute angle or angles  
3 relative to others of said conductors, said certain  
4 conductors defining LED addressing conductors to  
5 selectively address LEDs on said others of the  
6 conductors.

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9           40. The combination of claim 39 wherein said  
10 acute angle or angles are approximately 45°.

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13           41. The combination of claim 1 including  
14 protective means at one of the following:  
15               i) at the front of the grid;  
16               ii) at the rear of the grid;  
17               iii) at both the front and rear of the  
18 grid.

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21           42. The combination of claim 1 wherein said  
22 protection means includes at least one metallic plate.

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1                   43. The combination of claim 42 wherein said  
2 metallic plate is characterized by one of the  
3 following:

- 4                    $x_1$  forming air passing openings;  
5                    $x_2$  forming air passing louvers;  
6                    $x_3$  forming air passing through slits.

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9                   44. The combination of claim 42 wherein said  
10 protection means comprises a metallic screen or  
11 screens.

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14                   45. The combination of claim 1 wherein the  
15 diodes are removably supported by the grid.

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18                   46. The combination of claim 1 characterized  
19 by at least one of the following:

- 20                   i) diode emission control electronics  
21                   within diode packages  
22                   ii) diode emission control electronics  
23                   at or proximate an edge or edges of  
24                   the grid.

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1           47. The combination of claim 1 including a  
2 light reflecting mirror or mirrors within diode  
3 packages.

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6           48. The combination of claim 47  
7 characterized by one or more of the following:

- 8           i) a parabolic mirror  
9           ii) dual mirrors within a package  
10          iii) a parabolic trough forming mirror  
11               or mirrors.

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14           49. The combination of claim 1 including a  
15 conduit for extensions of the conductors, outside the  
16 grid.

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19           50. The combination of claim 49 including  
20 spring tension exerting means acting on the conduit.

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23           51. The combination of claim 49 including  
24 holders about which end portions of the conductors in  
25 the grid are looped, the holders associated with the  
26 conduit.

1                   52. The combination of claim 1 wherein the  
2 diodes comprise packages having adjustable operative  
3 connection to the conductors characterized by one of  
4 the following:

- 5                   i)    rotatable adjustability about one
- 6                           axis
- 7                   ii) rotatable adjustability about two
- 8                           axes.

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11                   53. The combination of claim 52 wherein the  
12 diodes in the array have different positions of  
13 adjusted angularity.

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16                   54. An LED array assembly, comprising in  
17 combination:

- 18                   a)    a grid of electrical conductors,
- 19                   b)    light emitting diodes in association
- 20 with the grid and in electrical communication with the
- 21 conductors that provide power for LED operation,
- 22                   c)    there being LED structure allowing
- 23 rotary adjustment of at least some LEDs relative to
- 24 conductors on which those LEDs are supported.

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1                   55. The combination of claim 54 wherein said  
2 rotary adjustment is characterized by one of the  
3 following:

- 4                   i) about an axis or axes defined by  
5                   the LED or LEDs  
6                   ii) about a conductor axis or axes  
7                   iii) about both i) and ii) above.

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10                   56. The combination of claim 54 including  
11 clip means positioning the conductors relative to which  
12 the LEDs are rotatably adjustable.

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